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State Water Resources Control Board

Division of Water Rights

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Arnold Schwarzenegger
Governor

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Linda Prendergast
Principal Aquatic Scientist
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Portland, Oregon 97232

Dear Ms. Prendergast:

COMMENTS ON PACIFICORP'S 2008 WATER QUALITY STUDY PLAN

On April 22, 2008, the State Water Resources Control Board (State Water Board) received PacifiCorp's "Planned 2008 Water Quality Studies for the Klamath Hydroelectric Project," which describes nine water quality studies that PacifiCorp anticipates conducting between April and December of 2008. According to Appendix B of PacifiCorp's 2008 Application for Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act, these studies intend to: "evaluate the effectiveness and feasibility of several technologies and measures to more effectively control water quality conditions in Copco and Iron Gate reservoirs." State Water Board staff offer the following comments and suggestions in response to PacifiCorp's 2008 Water Quality Study Plan. These comments are provided in order to improve the ability for PacifiCorp's planned studies to provide appropriate information and water quality data needed by the State Water Board as it evaluates PacifiCorp's Section 401 Water Quality Certification application. However, these comments should not be understood to reflect the extent of additional information the State Water Board will require regarding reservoir management and water quality in making an ultimate decision on PacifiCorp's application.

1) Periphyton Sampling

Periphyton (also referred to as benthic algae, macroalgae or attached algae) are an important indicator of environmental conditions in the Klamath River. Periphyton provide habitat for the polychaete host for the fish parasite *Ceratomyxa shasta*, which negatively affects fish populations and related beneficial uses on the Klamath River. There is a disease node just below Iron Gate Dam, which the Federal Energy Regulatory Commission's Final Environmental Impact Statement has linked to decreased flushing of periphyton.

A high abundance of periphyton in a river is often considered to be an indication of impairment that is associated with the presence of excess nutrients. Currently, the entire length of the Klamath River from the source in Oregon all the way to the Pacific Ocean is 303(d) listed as impaired for nutrients. High density clusters of periphyton can also lead to fluctuations in dissolved oxygen due to the oxygen demand exerted by both living algal biomass as well as detached biomass undergoing decomposition. Moreover, diel swings in pH are often associated with the presence of significant

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periphyton biomass due to the impact that photosynthetic processes have on the carbonate equilibrium in water. This effect is especially pronounced in the Klamath River because the low alkalinity river water leads to a weakly buffered system. The beneficial uses and water quality objectives established in the Water Quality Control Plan for the North Coast Regional Water Quality Control Board address the effects of periphyton, rather than regulating its presence directly. The Hoopa Tribal Water Quality Control Plan¹ on the other hand, specifies a periphyton standard of 150 mg Chlorophyll *a* per square meter of streambed area. This standard applies to the segment of the Klamath River that runs through the Hoopa Valley Reservation.

State Water Board staff requests that PacifiCorp amend the 2008 Water Quality Study Plan to include periphyton sampling. We recommend that sampling take place at multiple samples sites between Iron Gate Dam and the confluence of the Trinity River. The sampling methodology should be developed in consultation with other parties involved in water quality monitoring in the Klamath River basin including the North Coast Regional Water Quality Control Board, the lower Klamath tribes, and the State Water Board.

2) Increased Monitoring for Microcystis

PacifiCorp's 2007 Water Quality Study Plan included monitoring for the toxic cyanobacteria *Microcystis aeruginosa* at multiple sample sites along the Klamath River from Upper Klamath Lake downstream to River Mile 6, with sample collection taking place from July through September. In contrast, the 2008 Study Plan only includes sampling as far downstream as Walker Bridge, at River Mile 157. In the summer of 2007, recreational contact warning signs were posted on the Klamath River from below Iron Gate Dam downstream to the estuary because of elevated *Microcystis aeruginosa* levels. Considering the potential public health impacts created by the presence of toxic cyanobacteria in the Klamath River, State Water Board staff requests that PacifiCorp continue to monitor the river for the presence of *Microcystis aeruginosa* below Walker Bridge. An additional rationale for this downstream sampling is to assess compliance with the water quality standards contained in the Hoopa Tribal Water Quality Control Plan for microcystis which are expressed both as cell density (< 5,000 cells/mL for drinking water, < 40,000 cells/mL for contact recreation) and microcystin toxin concentration (< 1.0 µg/L for drinking water, < 8.0 µg/L for contact recreation). State Water Board staff recommends that PacifiCorp continue to sample for cyanobacteria at the four locations downstream of Walker Bridge that were included in the 2007 Water Quality Study Plan.

3) Fish Tissue Sampling for Cyanotoxins

Concern exists that the presence of toxic cyanobacteria *Microcystis aeruginosa* in Iron Gate and Copco Reservoirs and in the Klamath River may lead to the bioaccumulation of cyanotoxin in aquatic organisms, with potential consequences for

¹ Hoopa Valley Tribe (2008) Water Quality Control Plan

human health when fish and shellfish are consumed. Cyanotoxins were present in some of the 2007 fish and freshwater mussel samples collected from project reservoirs and the Klamath River and analyzed by the California Department of Fish and Game Fish and Wildlife Water Pollution Control Laboratory. Preliminary evaluation of the results² indicates that the concentration of cyanotoxin in some of the mussel and fish tissue samples exceeded human health guidelines that were based on a recent review of cyanobacterial toxins³. The Office of Environmental Health Hazard Assessment is currently reviewing the laboratory results to determine whether any action to limit ingestion of the fish and mussels is advised. To better understand the significance of cyanotoxin bioaccumulation for human health, the State Water Board requests that PacifiCorp conduct monitoring activities for cyanobacterial toxins in fish and mussels collected in and downstream of the project reservoirs. Fish and mussel sampling for cyanotoxin should take place not only during the summer, when bloom conditions are present in the reservoirs, but also year-round to better understand the duration of potential impacts.

4) Continuous Temperature Monitoring

The 2007 Water Quality Study Plan provided by PacifiCorp included a section that explicitly described how data for water temperature will be collected to create a continuous record based on hourly data. However, no mention is made of continuous temperature monitoring in the 2008 Water Quality Study Plan. State Water Board staff is concerned about this omission in the 2008 Study Plan and recommends that PacifiCorp continue to collect continuous water temperature data at the monitoring sites listed in the 2007 Study Plan.

5) Effectiveness Testing of Sodium Carbonate Peroxyhydrate (PAKTM27)

Any study of the use of chemical algaecides, such as sodium carbonate peroxyhydrate (PAKTM27), to control blooms of blue-green algae in PacifiCorp's reservoirs should also identify the water quality monitoring needed for an ecological risk assessment to provide information about any potential detrimental impacts to the aquatic community in and downstream of the reservoir that may result from the use of the chemical.

6) Pilot Testing of Solar-Powered Circulators in Copco Reservoir

It is difficult to assess the adequacy of PacifiCorp's plan to study the use of solar-powered circulators in Copco Reservoir due to the lack of detail provided in the 2008 Water Quality Study Plan. Of particular concern to State Water Board staff is the

² Kann, Jacob (2008) Technical Memorandum: Microcystin Bioaccumulation in Klamath River Fish and Mussel Tissue: Preliminary 2007 Results. Prepared for Karuk Tribe of California, Orleans, CA

³ Ibelings and Chorus (2007) Accumulation of cyanobacterial toxins in freshwater "seafood" and its consequences for public health: A review. *Environmental Pollution* 150: 177-192.

lack of information to address the lateral and vertical extent over which the solar-powered circulators are expected to affect water quality. Pilot-level testing of the solar-powered circulators should include multiple measurements of water quality parameters along transects that extend out away from the circulators to delineate circulator effectiveness in improving water quality.

In providing these comments regarding the 2008 Water Quality Study Plan, State Water Board staff also notes that only some preliminary data, and none of the technical reports that were identified in the 2007 Water Quality Study Plan, have been submitted by PacifiCorp. Our comments on the 2008 Study Plan are necessarily limited by this lack of information, as is our ongoing analysis of PacifiCorp's water quality certification application. We also look forward to the timely posting of the results from the current monitoring efforts for *Microcystis*, as proposed in the 2008 Water Quality Study Plan.

If you have any questions or comments, please contact me at (916)341-5397 or by email at jwatts@waterboards.ca.gov.

Sincerely,

ORIGINAL SIGNED BY

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